REMARKS

In the patent application, claims 1-20 are pending. In the office action, all pending claims are rejected.

Applicant has amended claims 17 and 20 to correct for informalities. No new matter has been introduced.

At sections 1 and 2 of the office action, the drawings are objected to because Figures 1a and 1b do not have a legend such as --prior art--.

Applicant submits herewith a substituted sheet for Figures 1a and 1b with the legend "prior art" added.

Applicant also submits herewith the formal drawing for Figures 5a and 5b.

At sections 3 to 5, claims 17-19 are objected to for containing informalities. Applicant has amended claim 17 as suggested by the Examiner.

At section 6, claim 20 is objected to because it ends with two periods. Applicant has amended 20 to correct for the informality.

At sections 8 –23 of the office action, claims 1, 3-10, 12, 14, 16-17 and 19 are rejected under U.S.C. 102(e) as being anticipated by *Higgins et al.* (U.S. Patent No. 6,266,633, hereafter referred to as *Higgins*). In rejecting these claims, the Examiner states that *Higgins* discloses a pre-processor 26 (Figure 1) which can be used to carry out all the tasks performed by the front-end of the claimed invention.

In the claimed invention, the front-end carries out three tasks: 1) extracting speech features, 2) normalizing the extracted speech features and 3) filtering the normalized speech features.

In *Higgins*, the preprocessor 26 carries out noise suppression in module 63 (Figure 2A). In particular, module 63 obtains the magnitude spectra of the spectral sequence 61 (Figure 2B) and constructs histograms of the magnitude spectra for each frequency by module 75 (col.7, lines 19-23). From the histogram, the background noise floor N_f is determined by module 80 (col.7,

lines 25-33). A spectral subtractor 100 is then used to subtract the noise floor from the magnitude spectra in order to provide a noise-suppressed signal sequence 104 (col.7, lines 55-60). Finally, a blind-deconvolution (BD) filter 110 is used to reconstruct the spectral sequence 112 (col.7, line 60 to col.8, line 24). The entire process is summarized at col. 9, lines 30-46.

The Examiner states that the preprocessor 26 normalizes the extracted speech features by subtracting the magnitude spectra from the noise floor and setting the negative results to zero, and filtering the normalized speech features by applying the blind deconvolution filter for reducing noise in the speech signal (col.5, lines 52-56).

It is respectfully submitted that *Higgins* does not disclose or even suggest the steps of normalizing speech features and filtering the normalized speech features. At col. 5, lines 54-60, *Higgins* discloses that blind deconvolution filter having a frequency response with a gain constant G is applied to the noise-floor subtracted magnitude spectra. G is used for the purpose of output level normalization. *Higgins* does not disclose normalizing the speech features and filtering the normalized speech features as claimed.

The normalization process in the claimed invention is used to increase the power of the high frequency components so that these high-frequency components can be effectively reduced by low-pass filtering. The normalization process of the claimed invention is carried out before noise reduction. Noise reduction is carried out in a subsequent filtering process. *Higgins* subtracts the noise floor from the magnitude spectra before the blind deconvolution is carried out. The blind deconvolution filter is only used to reconstruct the spectral data sequence from the spectral subtraction (SS)-processed magnitude. This filter is different from the low-pass filter of the claimed invention. As such, *Higgins* does not disclose normalization of the extracted speech features before low-pass filtering.

For the foregoing reasons, claims 1, 9, 14 and 17 are clearly distinguishable over *Higgins*.

As for claims 3-8, 10, 12, 16 and 19, they are dependent from claims 1, 9, 14 and 17 and recite features not recited in claims 1, 9, 14 and 17. For reasons regarding claims 1, 9, 14 and 17 above, it is respectfully submitted that claims 3-8, 10, 12, 16 and 19 are also distinguishable over the cited *Higgins* reference.

At section 24, claims 2, 11, 15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Higgins* in view of *Hermansky* (RASTRA processing of Speech, IEEE Trans. Speech and Audio Proc., vol.2, no.4, October 1994, pp. 578-589).

It is respectfully submitted that claims 2, 11, 15 and 18 are dependent from claims 1, 9, 14 and 17 and recite features not recited in claims 1, 9, 14 and 17. For reasons regarding claims 1, 9, 14 and 17 above, claims 2, 11, 15 and 18 are distinguishable over the cited *Higgins* and *Hermansky* references.

At section 29, claims 13 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Higgins* in view of ETSI ES 201 108 V1.1.2.

It is respectfully submitted that claim 13 is dependent from claim 9 and recites features not recited in claim 9. For reasons regarding claim 9 above, claim 13 is distinguishable over *Higgins* in view of ETSI ES 201 108 V1.1.2.

Claim 20 includes the limitation that the front-end includes means for normalizing the extracted speech features and means for filtering the normalized speech features. Neither *Higgins* nor ETSI ES 201 108 V1.1.2 discloses such normalizing and filtering means. Thus, claim 20 is distinguishable over *Higgins* in view of ETSI ES 201 108 V1.1.2.

CONCLUSION

As amended, claims 1-20 are allowable. Early allowance of claims 1-20 is earnestly solicited.

Respectfully submitted,

Kenneth Q. Lao
Attorney for the Applicant
Registration No. 40,061

WARE, FRESSOLA, VAN DER SLUYS
& ADOLPHSON LLP
Bradford Green, Building Five
755 Main Street, P.O. Box 224
Monroe, CT 06468
Telephone: (203) 261-1234
Facsimile: (203) 261-5676
USPTO Customer No. 004955

ANNOTATED MARKED-UP DRAWING

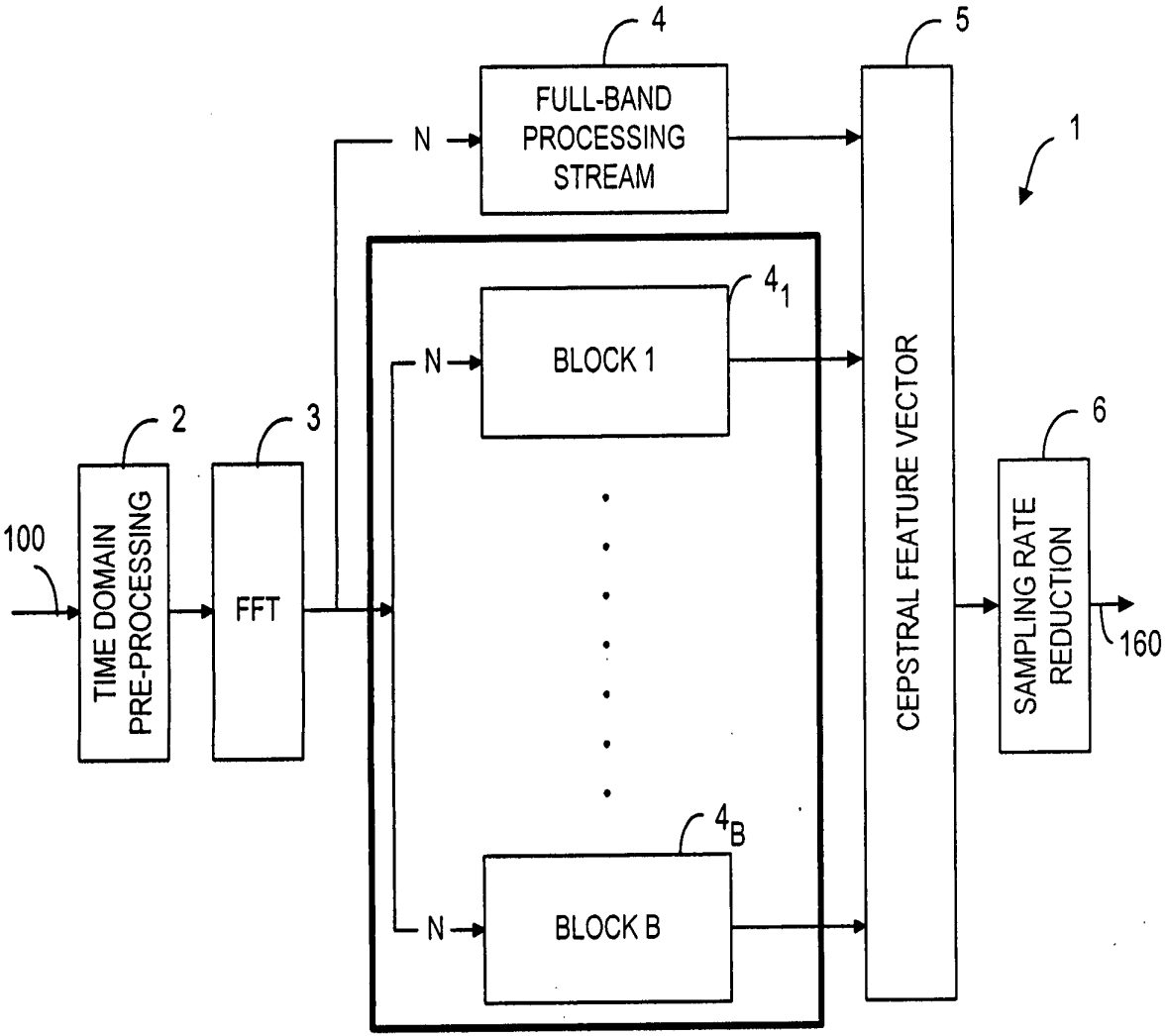

FIG. 1A
(PRIOR ART)

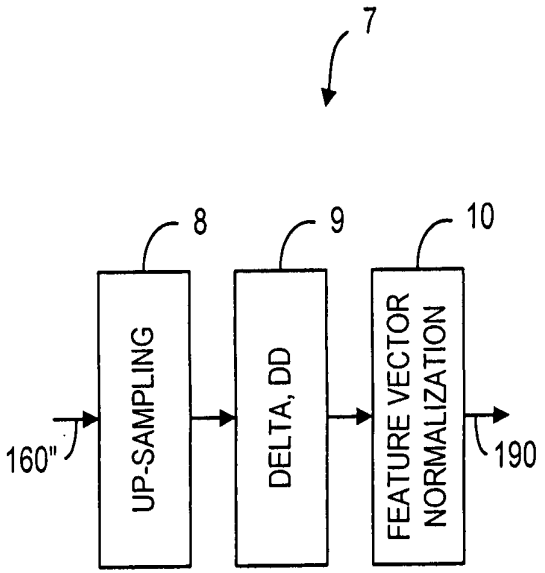

FIG. 1B
(PRIOR ART)